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BIOLOGY OF THE MEXICAN COTTON BOLL WEEVIL
IV. Duration of Fertility After Copulation[1]

By EDGAR F. GROSSMAN

The successful development of artificial hibernation quarters which enabled the cotton boll weevil (*Anthonomus grandis* Boh.) to live through the winter while being closely observed, led to definite information concerning the longevity of active spermatozoa in the spermatheca. A low temperature incubator, brine cooled to hold an average temperature of 55° Fahrenheit, provided artificial hibernation quarters. Individual weevils placed in small wire cages filled with Spanish moss provided that isolation of females which is necessary in order to determine the length of time spermatozoa can survive in the spermatheca.

A total of about seven hundred pairs of boll weevils were observed to copulate; thereupon the females were isolated and placed in the described hibernation quarters. A temperature of 60° Fahrenheit was maintained for two days after which it was lowered to and held at 55° Fahrenheit.

Beginning with a seven day period of isolation, several of the females were removed from hibernation, placed in a constant temperature incubator registering 80° F., and fed fresh cotton squares. After several days of feeding the weevils began to lay eggs. By examining the squares daily, egg punctures were recognized and each square in which the weevil had oviposited was isolated until the egg hatched. Though the majority of weevils were allowed to lay but few eggs, due to the scarcity of cotton squares, several weevils in each group were provided with squares for continued oviposition. In all cases the eggs laid were fertile. Following the seven day period, other weevils were tested after increasing lengths of time, until finally, suc-

[1]Contribution from the Department of Cotton Investigations, Florida Agricultural Experiment Station.

cessful oviposition of fertile eggs occurred after one hundred and seventy-nine days of isolation. This individual continued to lay eggs until a total of two hundred and one days had elapsed between the time of copulation and laying of fertile eggs.

OVIPOSITION RECORDS OF ISOLATED WEEVILS

Number Weevils Placed in Hibernation	Duration of Hibernation	Number Days Without Food	Number Days After Copulation During Which Fertile Eggs were Laid	Number Weevils Removed From Hibernation and Observed to Oviposit
60	Nov. 12–19	7	8–16	10
92	Oct. 15–Nov. 19	35	39–49	4
78	Oct. 26–Dec. 3	38	44–55	6
66	Oct. 26–Dec. 18	53	60–66	5
13	Oct. 19–Dec. 31	73	80–88	3
40	Oct. 20–Jan. 23	95	102–115	1
38	Oct. 16–Jan. 23	99	107–124	2
159	Nov. 15–Apr. 3	108	115–118	2
32	Oct. 16–Feb. 25	132	142–180	1
6	Nov. 19–Apr. 20	152	157–193	2
86	Jan. 23–July 2	161	168–175	1
4	Nov. 19–May 17	179	183–194	1
4	Nov. 19–May 14	176	187–201	1

The following information is presented in the accompanying table:

The number of isolated weevils placed in hibernation. Though large numbers of weevils were isolated, but comparatively few weevils lived for any considerable length of time. For example, one hundred and eighty two weevils were isolated and placed in hibernation quarters November 4th. By April 3rd, all were dead, none having been used for oviposition tests. Such groups of weevils are not recorded.

The duration of the period spent in hibernation: A record of the dates on which the weevils were placed in and subsequently removed from hibernation quarters. The weevils become par-

tially inactive when placed in an incubator averaging a temperature of 68° F. They became completely inactive when the temperature was reduced to 55° F. From time to time the isolated weevils were examined, those which had died were removed.

The number of days without food. This column represents the number of days each weevil which was used for the oviposition tests spent in hibernation; a repetition of the "Duration of hibernation" column, with numerical values substituted for the recorded dates.

The number of days after copulation during which fertile eggs were laid. The information presented in this column shows increasing periods of time during which active spermatozoa survived in the spermatheca.

Number of weevils removed from hibernation and observed to oviposit. But few weevils were removed at a time from each group of individuals placed in hibernation. Both the scarcity of cotton squares, obtainable during the winter months only from plants grown in the greenhouse, and the difficulty of handling large numbers of isolated weevils, necessitated experimentation with small numbers of weevils.

It is significant that fertile eggs were laid after a period of almost seven months after copulation. Oviposition after the weevil emerges from hibernation is, therefore, not delayed until chance copulation insures fertilization of the eggs. Consequently, the ability of boll weevils to lay fertile eggs seven months after copulation insures early infestation of the cotton fields in the spring.

The author has not observed parthenogenesis in the boll weevil to occur.

THE MEDITERRANEAN FRUIT FLY

The progress made towards the eradication of the fruit fly since our last issue has been very gratifying indeed. As a result of the thorough cleanup of all known and suspected hosts in and about the infested areas and the systematic spraying with the poisoned bait, the fly is now very scarce. At the time of going to press it has been several weeks since a fly has been caught.

Although cage experiments are frequently adding wild fruits to the known list of hosts, no infestations are being found in wild hosts in uncultivated areas.

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NOTES ON LYMIRE EDWARDSI GROTE, THE RUBBER TREE CATERPILLAR

Lymire edwardsi was assigned by Grote to the genus *Scepsis* when he described it. Under this old generic name on page 361 of volume II of "Insect Life", Dr. H. G. Dyar described the larval stages in detail.

Distribution: Dr. Dyar obtained his larvae from Dade County, Florida. Since this work was done, Dade County has been split up to form a part of Palm Beach and Broward counties. The specimen or specimens which were described by Grote were taken in Florida but there is no way of placing the definite location in the state. During the fall of 1928, specimens were sent in from Vero Beach, in Indian River County, which is between one-third and one-half the distance up the coast from the southern tip of Florida. Specimens were also collected at St. Petersburg in Pinellas County. These latter had nearly defoliated a fourteen foot rubber *(Ficus* sp.) tree. From these localities one would draw the conclusion that *Lymire edwardsi* is of general distribution where its host may grow which is the more semitropical area of Florida.

Parasites: There are two important parasites of *Lymire edwardsi,* one a hymenopterous, *Brachymeria robusta* (Crest). and the other a dipterous, *Phorocera claripennis* Macq. From the sixty pupae and larvae coming to us only two moths emerged. This indicates over a ninety-six percent parasitization. The Tachina flies were more numerous from the material from Vero Beach, but there were a few of the Brachymeria also. The material from St. Petersburg produced about equal numbers of these parasites.

The writer wishes to thank Dr. O. A. Johannsen for identification of the Diptera and Prof. Harold Morrison for that of the Hymenoptera.

H. E. BRATLEY.

NOTES ON A FEW HOMOPTERA FROM UTAH[1]

By GEORGE F. KNOWLTON

The writer is indebted to Professor Herbert Osborn and Mr. W. L. McAtee for the determination of most of the material listed below. The collections were largely made in connection with a study of the distribution and breeding grounds of the beet leafhopper, *Eutettix tenellus* (Baker). A number of the species have not been previously recorded from Utah, while new localities are given for many of the forms known to occur here. Unless otherwise designated, collections were made by the writer.

Family CERCOPIDAE (Leach)

Genus *Clastoptera* Germar

Clastoptera osborni Gillette and Baker*
Ogden, June 28, 1925

Clastoptera delicata Uhler*
Lehi, June 23, 1926; Monroe, June 28, 1926

Clastoptera lineatocollis Stal.
Draper, June 23, 1926; Monroe, June 28, 1926

Family MEMBRACIDAE (Germar) *(Treehoppers)*

Genus *Ceresa* Amyot and Serville

Ceresa bubalus (Fabricius)
A very common and often damaging species, collected in Utah, from Brigham City, Corinne, Fielding, Greenville, Kaysville, Lewiston, Logan, Murray, Riverside, Salt Lake City, Smithfield, Themonton, Trout Creek, Willard, and a number of other localities.

Ceresa basalis Walker
Logan, August 15, 1923 and September 2, 1925

Ceresa albidosparsa Stal*
Provo, September 8, 1923 (I. M. Hawley)

Genus *Stictocephala* Stal

Stictocephala inermis (Fabricius)*
Greenville, August 19, 1927; Logan, July 19, 1923

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[1]Contribution from Department of Entomology, Utah Agricultural Experiment Station Publication authorized by Director, January 29, 1929.

*Signifies a form not recorded from Utah in Van Duzee, Catalogue of the Hemiptera of America north of Mexico, 1917.

Stictocephala pacifica Van Duzee*

Logan, July 21, 1924; Providence, June 15, 1924; Provo, September 18, 1923 (I. M. Hawley); Snow, August 7, 1924 (C. J. Sorenson)

Stictocephala festina (Say)

North Logan, July 17, 1923

Stictocephala gillettei Goding

A fairly common form in Utah. Brigham City, September 10, 1925; Logan Canyon, July 28, 1926; Millville, September 2, 1926; Murray, September 14, 1925

Genus *Telamona* Fitch

Telamona sp.

Logan, July 6, 1924

Genus *Campylenchia* Stal

Campylenchia latipes (Say)*

This is a fairly common form in northern Utah. Greenville, August 19, 1924; Lewiston, August 20, 1925; Logan, July 21, 1923 and July 19, 1924; Paradise, August 19, 1925; Salt Lake City, July 28, 1924; Smithfield, August 24, 1925; Smithfield Canyon, August 24, 1925.

Family CICADELLIDAE (Latreille)
(LEAFHOPPERS)

Genus *Agallia* Curtis

Agallia sanguinolenta (Provancher)

This species is often very abundant on many of the weed hosts that *Eutettix tenellus* (Baker) frequents. It is commonly observed thruout Utah, and has been collected at Bear River City, Cove Fort, Deseret, Draper, Fielding, Fillmore, Garrison, Harrisville, Lewiston, Lookout Pass, Lynndyl, Monroe, Richfield, Snowville, Torry and many other places.

Agallia uhleri Van Duzee*

Draper, July 18, 1926.

Agallia cinerea Osborn and Ball*

This species occasionally is rather abundant. Black Rock, July 21, 1926; Cedar City, July 22, 1926; Fillmore, July 21, 1926; Frisco, July 21, 1926; Lewiston, July 28, 1926.

Genus *Macropsis* Lewis

Macropsis sordida (Van Duzee)*

Monroe, June 28, 1926.

Genus *Bythoscopus* Germar

Bythoscopus robustus (Uhler)*
Rather numerous at Monroe, June 28, 1926

Bythoscopus franciscanus (Baker)*
Numerous at Monroe, June 28, 1926

Bythoscopus grandis (Ball)
Paragoonah, July 25, 1926.

Genus *Oncometopia* Stal

Oncometopia lateralis (Fabricius)
Salt Lake City, September 14, 1925.

Genus *Cicadella* Latreille

Cicadella hieroglyphica (Say) Variety *uhleri* Ball
Numerous at Monroe, June 28, 1926.

Cicadella circellata (Baker)*
Monroe, June 28, 1926.

Genus *Helochara* Fitch

Helochara communis Fitch*
North Logan, August 6, 1925.

Genus *Gypona* Germar

Gypona melanota Spangberg*
Brigham City, September 10, 1925; Kanesville, September 17, 1925; Willard, September 10, 1925.

Genus *Xerophloea* Germar

Xerophloea viridis (Fabricius)
Bear River City, September 3, 1926; Fielding, September 2, 1925; Garrison, July 21, 1926; Hooper, September 17, 1925; Hurricane, September 24, 1926; Lewiston, October 5, 1926; Richmond, September 1, 1926.

Genus *Platymetopius* Burmeister

Platymetopius latus Baker*
Taken at an elevation of 6000 feet on rose, Spring Canyon, August 28, 1925.

Genus *Deltocephalus* Burmeister

Deltocephalus striatus (Linnaeus)*
Amalga, September 15, 1928; Smithfield, September 15, 1928.

Genus *Euscelis* Brulle

Euscelis exitiosus (Uhler)*
Bear River City, September 9, 1925; Draper, July 18, 1926;

Hyrum, August 3, 1926; Lynndyl, July 1, 1926; Modina, July 23, 1926; Ogden, September 5, 1926; Portage, August 20, 1926; Salt Lake City, July 27, 1924; Tremonton, September 7, 1923.

Euscelis obscurinervis (Stal.)*

American Fork, September 6, 1926; Clover, July 16, 1926; Cornish, August 18, 1926; Cove Fort, July 1, 1926; Deseret, July 1, 1926; Garrison, July 21, 1926; Harrisville, July 24, 1926; Kanesville, July 24, 1926; New Castle, July 23, 1926; Trout Creek, July 19, 1926.

Euscelis striolus (Fallen)*

Numerous at Monroe, June 31, 1926.

Genus *Eutettix* Van Duzee

Eutettix tenellus (Baker)

Utah localities for this species would include Adamsville, Appleton, Avon, Bennion, Calls Fort, Cedar Creek, Cliff, Cold Creek Canyon, Curlew, Desert, Elgin, Flowell, Floy, Fool Creek, Genola, Gifford, Granger, Grassy, Green River, Greenville, Harrisburg, La Verkin, Leland, Mantua, Minersville, Nibley, Orrs Ranch, Pahvant, Paradise, Parley, Showell, Soldier Creek, Solitude, Sphinx, Sunnyside, Taylorsville, Tropic, Vineyard, Warren, West Point, Wilson and Woodside.

Genus *Phlepsius* Fieber

Phlepsius ovatus Van Duzee

Often numerous. Cedar City, July 25, 1926; Deseret, July 1, 1926; Draper, June 23, 1926; Faust, July 18, 1926; Grantville, July 17, 1926; Monroe, June 28, 1926; Paragonah, July 25, 1926; Zion's National Park, July 24, 1926.

Phlepsius irroratus (Say)

Ogden, September, 1926; Richmond, September 9, 1926.

Genus *Acinopterus* Van Duzee

Acinopterus acuminatus Van Duzee

Monroe, June 6, 1926.

Genus *Thamnotettix* Zetterstedt

Thamnotettix geminatus Van Duzee*

Bear River City, September 9, 1925; Richmond, September 9, 1926; Smithfield, September 15, 1928; Trenton, September 15, 1926.

Thamnotettix clitellarius (Say)*

Bear River City, September 9, 1925.

Thamnotettix montanus Van Duzee

Cornish, August 18, 1926; Grantville, September 16, 1925; Ogden, September 11, 1926; Willard, September 11, 1926.

Thamnotettix belli (Uhler)*

Logan, September 1, 1925.

Genus *Cicadula* Zetterstedt

Cicadula sexnotata (Fallen)*

Sometimes numerous. Corinne, September 9, 1925; Fish Lake, June 28, 1925; Lewiston, August 4, 1925; Richmond, September 9, 1926; Torry, June 26, 1926.

Genus *Eugnathodus* Baker

Eugnathodus abdominalis (Van Duzee)*

Austin, June 25, 1926; Elsinore, June 25, 1926; Monroe, June 28, 1926.

Genus *Dikraneura* Hardy

Dikraneura carneola (Stal.)*

Bear River City, September 9, 1925.

Genus *Empoasca* Walsh

Empoasca aspersa Gillette and Baker

Nephi, July 25, 1926.

Empoasca tessellata Gillette

Elsinore, June 24, 1926; Hyrum, August 1, 1926; Nephi, July 25, 1926.

Empoasca mali (Le Baron)*

Common in northern Utah on apple, rose and other plants.

Brigham City, September 9, 1925; Farmington, June 1, 1923; Logan, August 3, 1926; Provo, June 23, 1926; Salt Lake City, July 28, 1923.

Empoasca flavescens (Fabricius)*

Bear River City, September 9, 1925; Hyrum, August 8, 1925.

Genus *Typhlocyba* Germar

Typhlocyba sp.

Brigham City, September 10, 1925.

Genus *Empoa* Fitch

Empoa rosae (Linnaeus)*

Common on apple and rose in northern Utah. Logan, July 8, 1923; Magna, September 15, 1925; Salt Lake City, September 17, 1924.

Empoa fabae (Harris)*
Riverside, September 11, 1926; Willard, September 10, 1925.

Genus *Erythroneüra* Fitch

Erythroneura comes (Say)
Brigham City, September 12, 1925; Ogden, July 22, 1927.

Family FULGORIDAE (Latreille) *Lanternflies*

Genus *Scolops* Schaum

Scolops sulcipes (Say)
Logan Canyon, July 28, 1926.

Scolops perdix Uhler*
Monroe, June 28, 1926.

Scolops angustatus Uhler*
Zion's Canyon, July 24, 1926.

Scolops hesperius Uhler
Monroe, June 28, 1926.

Genus *Oliarus* Stal.

Oliarus franciscanus (Stal.)*
Elsinore, June 24, 1926.

Genus *Cixius* Latreille

Cixius cultus Ball*
Brigham City, September 24, 1926; Monroe, June 28, 1926.

Genus *Oecleus* Stal.

Oecleus borealis Van Duzee*
Monroe, June 28, 1926.

Oecleus obtusus Ball
Monroe, June 28, 1926.

Genus *Danepteryx* Uhler

Danepteryx manca Uhler*
Monroe, June 28, 1926.

Genus *Ormenis* Stal

Ormenis saucica Van Duzee
Numerous Leeds, July 24, 1926.

Genus *Stobaera* Stal

Stobaera tricarinata (Say)*
Fairly numerous at Monroe, June 28, 1926.

Genus *Liburnia* Stal

Liburnia (Delphacodes) sp.
Brigham, September 10, 1925; Corinne, September 10, 1925; Hooper, September 17, 1925.

Family CHERMIDAE (Fallen)

Genus *Livia* Latreille

Livia caricis Crawford
Benson, July 17, 1926; Dry Lake, August 10, 1927; Grantsville, July 17, 1926.

Genus *Aphalara* Forster

Aphalara rumicis Mally*
Salt Lake City, July 26, 1926.

Aphalara artemisiae Forster
Delta, July 20, 1926; Snowville, June 2, 1927.

Aphalara angustipennis Crawford
Brigham Canyon, September 5, 1925.

Aphalara minutissima Crawford
Santaquin, July 25, 1926.

Genus *Paratrioza* Crawford

Paratrioza cockrelli (Sulc.)
Common in potato-growing areas of Utah, on potato, tomato and other solanaceous plants. Collected at Brigham City, Cedar City, Collinston, Delta, Deweyville, Farmington, Honeyville, Hooper, Logan, Ogden, Provo, Salt Lake City, and a number of other places in the state.

Genus *Euphalerus* Schwarz

Euphalerus nidifex Schwarz*
Spring Canyon, 6800 ft. August 28, 1925.

Genus *Arytaina* Forster

Arytaina chelifera Crawford
Emigration Canyon, June 22, 1926.

YOTHERS LEAVES FOR HAWAII

W. W. Yothers of Orlando is planning to leave the middle of October for Honolulu where he will study the Mediterranean fruit fly. He plans to be gone about six months.

THE SCARABAEIDAE OF FLORIDA

By W. S. BLATCHLEY
Dunedin, Florida

(Continued from page 37)

Genus XXVII. PHYLLOPHAGA Harris.

Large or medium sized leaf eating Scarabaeidae, varying in color from pale brownish-yellow to piceous and having the body loosely built; antennae 9- or 10-jointed, club 3-jointed; front coxae transverse, not prominent, contained wholly within the coxal cavities; ventral segment six, connate, but with sutures distinct; tarsal claws never serrate, but with a single tooth beneath. They are commonly known as May-beetles or June-bugs and their larvae are the well known thick bodied "white grubs" which do much damage to the roots of corn, grass and other plants. The beetles vary little except in size and sculpture, and the principal characters separating them pertain to the male sex. They were formerly listed under the generic name *Lachnosterna* Hope, but that of Harris has priority by 11 years. About 100 species are known from this country, 29 from Florida. As I have not been in the State later than May 1, the genus is poorly represented in my collection. In the brief diagnosis of each species no mention is made of the genital organs of the male. Persons desiring to use them in their determinations are referred to the papers of Smith and J. J. Davis and to plates I-V of the "Coleoptera of Indiana."

*103. (13479). **P. latifrons** (Lec.)

Length 15-18 mm. Oblong, subcylindrical; purplish-brown to brownish-yellow, usually strongly pruinose, abdomen pale; clypeus entire; antennae 10-jointed in this and the next five species; hind tibiae of male in this and the following species to No. 125 with the inner spur fixed and often short or wanting. Male with abdomen deeply impressed, the last ventral nearly vertical, deeply concave, its apex ending in two small denticles; fixed spur of hind tibiae moderately long.

A common species throughout the State, appearing at Dunedin as early as February 27; more common in May, June and July, when it flies by scores to light. Recorded from numerous stations. Known only from Florida.

*104. (13483). **P. prununcula** (Burm.)

Length 14-18 mm. Robust, subcylindrical; reddish-brown to black, often slightly iridescent; clypeus feebly broadly emarginate; metasternum nearly naked. Male with the last ventral deeply impressed, the ridge at hind border with a cusp each side; inner spur of hind tibiae wanting.

Cedar Keys, Capron and Tampa (Sz.); Crescent City (Fall); Fort Myers (Dav.); St. Petersburg (Schf.). Gainesville, at light, June 6; a swarm of hundreds eating foliage of pine at night, June 8 (Doz.). Lake City, June (J. J. D.). Dunedin and West Palm Beach, May 22-Sept. 20, at light (Bl.).

105. (13484). **P. elongata** (Linell), 1895, 725.

Length 16 mm. Very elongate, subcylindrical, finely and sparsely pubescent; rufo-testaceous, moderately shining; clypeus distinctly emarginate; metasternum sparsely hairy. Male with antennal club slightly longer than stem; last ventral vaguely concave; fixed spur very short.

This and the next species each described from two males taken in "Florida" by Chas. Palm; the types in the U. S. Nat-Mus. Enterprise (Dietz).

106. (13485). **P. parva** (Linell), 1895, 726.

Length 12 mm. Elongate, subcylindrical; dark brown, shining, glabrous above; clypeus feebly emarginate; metasternum densely and finely punctate and with long hairs. Male with club distinctly longer than stem; last ventral deeply concave with a cusp each side within the concavity; fixed spur very short or wanting.

Enterprise (Dietz).

*107. (13486). **P. glabberima** (Blanch.).

Length 13-15 mm. Oblong, slender, subcylindrical; chestnut-brown, strongly shining, glabrous; clypeus broadly feebly emarginate; metasternum nearly naked. Male with last ventral deeply concave, with two tubercles within the concavity; inner spur wanting.

Numerous records from northern half of State, south to Gulfport (Fall); La Belle and Ft. Myers (Dav.); Dunedin, June 15, at porch light (Bl.).

108. (13487). **Pephilida** (Say).

Length 14-19 mm. Less slender, subcylindrical; brownish-yellow, moderately shining, head and thorax darker; clypeus broadly emarginate; metasternum with long, not dense hair. Male with penultimate ventral emarginate behind, granulate in front of the notch; last ventral also emarginate and concave, the concavity granulate, its sides ending in an obtuse tubercle; fixed spur distinct, short.

"Occurs from Canada to Florida and Texas." (Horn, 1887a, 226). Sevenoaks (Wick.).

109. (13493). **P. clemens** (Horn), 1887a, 227.

Length 10-11 mm. Oblong, slightly broader behind; rufo-testaceous, shining, head piceous; antennae 9-jointed; clypeus entire. Abdomen of male with a longitudinal impression, the last ventral with a slight concavity; fixed spur one-half the length of outer one.

"Occurs in Florida and Texas." (Horn, loc. cit.). The only record.

*110. (13494). **P. dispar** (Burm.).

Length 9.5-12 mm. Elongate, subcylindrical; color variable, pale rufotestaceous to dark brown or piceous, shining, glabrous; clypeus entire, deeply concave; antennae 9-jointed; metasternum almost naked. Male with middle of abdomen vaguely impressed, last ventral concave, a small bifid process projecting back from front margin of the concavity; inner spur of hind tibiae nearly as long as outer.

This species, including *boops* Horn, now considered a synonym, has been recorded from numerous stations as far south as Tampa and Gulfport. Common at Dunedin, June-September, at light.

111. (13495). **P. debilis** (Lec.).

Length 10.8 mm. Elongate-oblong; pale brownish-yellow, shining, head darker; clypeus rounded, deeply concave; antennae 9-jointed, last joint of maxillary palpi oval, impressed on outer side. Male with thorax less coarsely and deeply punctate than in female; inner spur of hind tibiae slightly oblique, thus forming an inferior emargination; last ventral feebly broadly foveate.

"Occurs in Florida" (Horn, 1887a, 229). "Fla." without definite station (Fall Coll.).

112. (13496). **P. gracilis** (Burm.).

Length 10.5-13 mm. elongate, subcylindrical. Pale reddish-yellow, head and thorax darker; clypeus short, broadly, shallowly emarginate; antennae 10-jointed, club in male as long as stem; tooth of tarsal claws very small, median. Male with middle of penultimate ventral abruptly declivous, last ventral feebly concave; inner spur of hind tibiae long, obtuse, curved and slightly twisted.

Tallahassee, March 3; collected by R. N. Wilson (J. J. D.).

113. (13497). **P. futilis** (Lec.).

Length 12-17 mm. Oblong, convex; pale chestnut or dark reddish-brown or brownish-yellow, moderately shining; clypeus feebly emarginate, sparsely and coarsely punctate; metasternum densely pubescent. Abdomen of male broadly feebly impressed; last ventral deeply concave; inner spur of hind tibiae contorted, S-shaped.

Gainesville and Lake City (Ag. Coll.); determined by J. J. Davis. Not before recorded from south of Virginia. The *P. gibbosa* Burm. is a synonym.

114. (13500). **P. postrema** (Horn), 1887a, 233.

Length 19 mm. Oblong, moderately robust; chestnut-brown, shining; antennae in this and the species up to **quercus** 10-jointed; clypeus more or less emarginate, feebly concave; punctures of thorax not coarser than those of elytra. Male with abdomen slightly flattened, penultimate ventral with a transverse ridge, which is excavated behind parallel with the margin; inner spur of hind tibiae long and slender.

"One male, Florida" (Horn). Lake City, June 1-2, collected by C. W. Mason (J. J. D.).

115. (13504). P. subpruinosa (Csy.).

Length 15 mm. Oblong-oval; chestnut-brown, feebly pruinose; body glabrous in this and species up to **hirticula**; clypeus in this and the next species feebly emarginate, not densely punctate; side margins of thorax in this and the next two species not serrate. Last ventral of male with a smooth cup-shaped depression; inner spur of hind tibiae two-thirds the length of outer.

"Eight specimens were taken near Jacksonville by the late Edward Tatnall" (Horn, 1887a, 240). Enterprise (Dietz); Ft. Reed, March 25 (J. J. D.).

***116. (13508). P. micans** (Knoch).

Length 15-17 mm. Oblong, slightly broader behind; brownish-black with a conspicuous pruinose coating. Male with last ventral without a well defined concavity; penultimate ventral with a feebly elevated arcuate ridge at middle; inner spur of hind tibiae half the length of outer, slightly curved outward.

Tampa, common in April (Sz.); Crescent City (Sz. Ms.). Gainesville, on pine, and Lake Wales (Ag. and P. B. Colls.). Enterprise (Dietz); Plant City, March 20 (J. J. D.); Dunedin, March 6 (Bl.).

117. (13509). P. diffinis (Blanch.).

Length 15 mm. Oblong, subdepressed; reddish-brown, shining, not pruinose; thorax and elytra very coarsely punctate. Penultimate ventral of male with a straight transverse ridge near hind margin, along which the segment is impressed; inner fixed spur acute, half the length of outer one. The **L. comans** Burm. is a synonym.

"Duval Co., Florida" (Horn, 1887a, 244). Tallahassee, Apr. 19 (J. J. D.).

118. (13512). P. ulkei (Smith), 1889, 94.

Length 21-22 mm. Ovate, robust; rufo-castaneous, shining; clypeus slightly emarginate, rather closely punctate; side margins of thorax feebly crenulate; metasternum with long dense hair. Penultimate ventral of male with a straight transverse ridge, behind this a deep abrupt concavity; last ventral concave; inner spur of hind tibiae stouter than and two-thirds the length of outer one.

Types in part collected by Ashmead in eastern Florida. No other State records.

119. (13513). P. quadrata (Smith) 1889, 94.

Length 22 mm. Oblong. sides parallel; deep brown, shining; clypeus nearly square, feebly emarginate, coarsely and sparsely punctate. Male unknown.

The single female type was taken by Schwarz at Enterprise in May. (Smith). No other record.

120. (13522). **P. fraterna** Harris.

Length 15-18 mm. Oblong, scarcely broader behind; reddish-brown, fuscous or piceous, shining; clypeus rather deeply emarginate, densely punctured; sides of thorax not angulate, the margins slightly crenate. Male with penultimate ventral impressed at middle, slightly granulate, last ventral deeply concave and smooth; inner spur of hind tibiae stouter and one-third shorter than the outer one.

Enterprise, very rare in May (Sz.); in Leconte collection.

121. (13523). **P. forsteri** (Burm.).

Length 17-18 mm. Oblong, nearly parallel; wholly rufo-castaneous, strongly shining, or with head and thorax nearly piceous, elytra reddish-brown; thorax coarsely punctate, and disk with large smooth areas. Otherwise as in **fraterna**, of which Horn considered it a variety.

"Florida" (J. J. Davis, 1920, 333); Gainesville, July 24 (P. B. Coll.).

122. (13524). **P. infidelis** (Horn), 1887a, 253.

Length 19-21 mm. Oblong, broader behind; chestnut-brown, head and thorax darker, shining. In this and the next species the clypeus is flat, emarginate, densely punctate and the sides of thorax obtusely angulate, their margin serrate or crenate. Male with penultimate ventral only slightly depressed at middle of hind border; last ventral slightly concave; inner spur of hind tibiae very short.

"Occurs in Georgia and Florida" (Horn). No other record.

123. (13525). **P. luctuosa** (Horn), 1887a, 254.

Length 20-22 mm. Dark brown or piceous, moderately shining; clypeus slightly emarginate, densely punctate. Penultimate ventral of male with a rugose transverse ridge just in front of hind border; last ventral depressed and granulate; spurs of hind tibiae equal in length, long, slender, acute.

"Occurs in South Carolina, Georgia, Florida, Alabama and Louisiana" (Horn). Tallahassee, Apr. 19 (J. J. D.). No other records.

124. (13538). **P. hirticula** (Knoch).

Length 16.5-19 mm. Oblong, slightly wider behind; reddish-brown to dark chestnut-brown, head and thorax with erect hair, elytra with lines of erect hairs along the usual costa; thorax densely, cribrately punctured, with basal margin channeled from hind angles nearly to middle, the sides not subangulate. Male with penultimate ventral depressed on posterior half, its sides plicate; last ventral slightly concave; inner fixed spur moderately long, acute.

Tallahassee, March 23 (P. B. Coll.); March 3 and April 19 (J. J. D.). No definite printed record from the State.

(To be continued)

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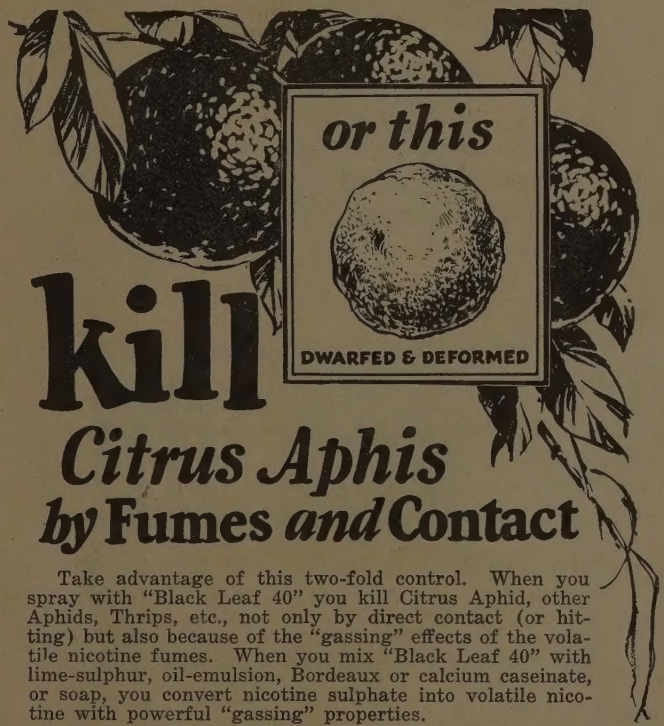

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